

# ***Program Support for Mission Success***

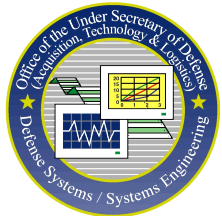


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*Office of the Under Secretary of Defense for Acquisition,  
Technology and Logistics*

*16-17 November 2004*



# USD(ATL) Imperatives



- “Provide a context within which I can make decisions about individual programs.”
- “Achieve credibility and effectiveness in the acquisition and logistics support processes.”
- “Help drive good systems engineering practices back into the way we do business.”

THE UNDER SECRETARY OF DEFENSE  
3010 DEFENSE PENTAGON  
WASHINGTON, DC 20301-3010  
FEB 20 2004

MEMORANDUM FOR: SEE DISTRIBUTION  
SUBJECT: Policy for Systems Engineering in DoD

Application of rigorous systems engineering discipline is paramount to the Department's ability to meet the challenge of developing and maintaining needed warfighting capability. This is especially true as we strive to integrate increasingly complex system systems engine systems perform and performed a

Toward a to be included in

Systems En requirement vides SE ownership of Programs of Decision An review, and the program direct, and conduct, and

In support a. content ge b. processes to me need

c. Establish a senior-level SE forum with participation from the Military Departments, and appropriate defense agencies, as a means to collaborate and leverage activities within the components and to provide a forum to institutionalize SE discipline across the Department. A goal of this forum will be extending the SE process to address family-of systems, system-of-systems capability-based acquisition.

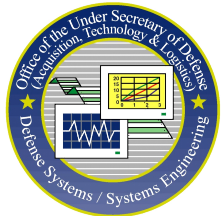
d. For programs where I am the MDA, review each program's SEP as part of the preparation for Defense Acquisition Board Milestone Reviews (DAB) and other acquisition reviews, provide me with a recommendation on the program's readiness to proceed during the DAB. Together with other members of the OSD staff, lead program support assessments to identify and help resolve issues to ensure program success.

To assist in these efforts, each Component Acquisition Executive and defense agency with acquisition responsibilities will, within 90 days, provide the Director, Defense Systems its approach and recommendations on how we can ensure that application of sound systems engineering discipline is an integral part of overall program planning, management, and execution within both DoD and defense industry. Further, I direct each Component Acquisition Executive and those defense agencies with acquisition responsibilities to provide, within 30 days, a flag officer or Senior Executive Service-level representative to participate in the Director, Defense Systems-led systems engineering forum. The first such forum will be held within 60 days.

I need your assistance to ensure we drive good systems engineering processes and practices back into the way we do business. We can accomplish this goal by establishing clear policies, reinvigorating our training, developing effective tools, and using and institutionalizing best practices, applying performance incentives, and making systems engineering an important consideration during source selections and throughout contract execution. Collectively these actions will reinvigorate our acquisition community - including our industry partners - thus assuring affordable, supportable, and above all, capable solutions for the warfighter.

Michael W. Wynne  
Acting

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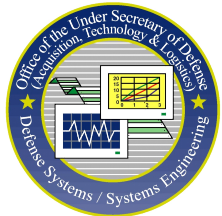


# ***Program Support relating to USD(ATL) Imperatives***

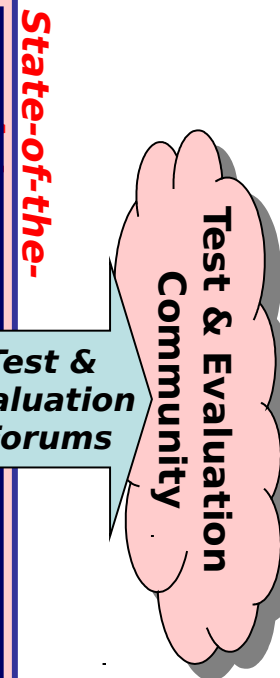
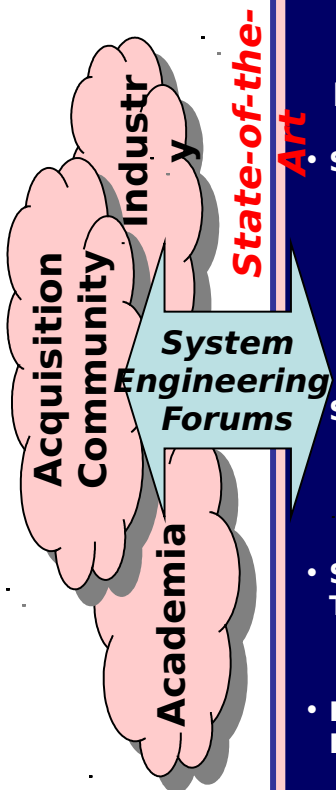


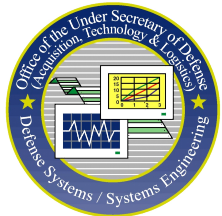
## ***Program Support is one of our key enablers to institutionalizing the USD(ATL) imperatives...***

- Assist Program Offices and help implement disciplined Systems Engineering practices
- Support and provide oversight of Developmental T&E
- Provide expert advice to help identify and mitigate risks relating to **cost-schedule-performance** and achieve program success
- Provide senior leadership with needed information to support the decision making process



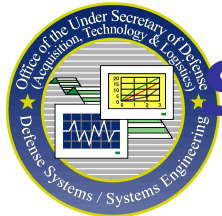
# Program Executive Offices Program Managers





# ***Evolution of SE Program Support***

- Early-Mid 1990s: “Blue Book” Reviews
- 1998 - 2003: OSD developed Tri-Service Assessment Initiative (TAI)
  - Provide non-advocate assistance to PMs
  - Fee-for-Service Independent Expert Reviews
  - Initial software focus expanded to full program assessments
  - Successfully conducted 50 + TAI Assessments
- 2003 - 2004: Focus broadened to support OSD oversight reviews and to provide program support
  - Renewed interest in OSD oversight for decision making, re-energizing systems engineering, ensuring program success

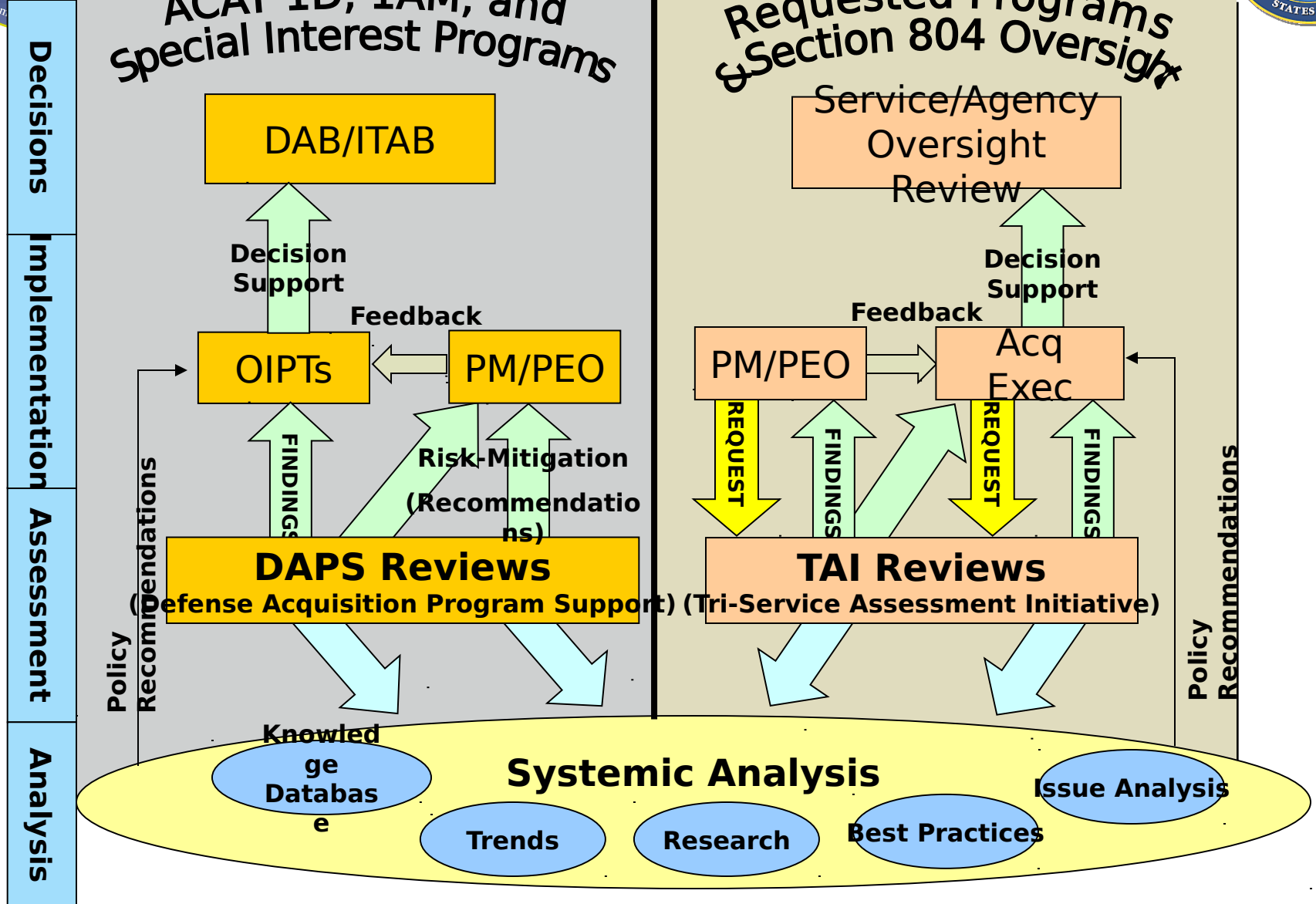


# ***Status of Current Program Support Methodologies***

- DAPS Methodology built upon TAI assessment typology
  - Focus is primarily on ACAT ID and 1AM programs
  - Key assessment areas retained
    - Requirements, Resources, Management, Process, Product, and Environment
  - Assessment areas modified to emphasize systems engineering
  - More detailed criteria and related questions incorporated as guidelines
  - Scope now addresses pre-milestone decision criteria
- TAI will continue to provide Non-Advocate Reviews for PMs
  - TAI technical management has been transitioned to DCMA

Defense Systems will remain the TAI sponsor;







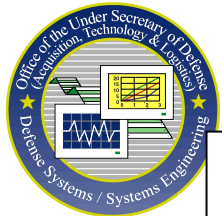
# ***Cornerstone for SE Program Support***



## ***DAPS “toolkit” is an enabler for...***

- Assessments for DAB/ITAB via IIPT/OIPT process
- Non-Advocate Support Assessments (TAI)
- DAES Assessments
- Assessment of Operational Test Readiness (AOTR)
- SE & T&E support to PMs
- SEP and TEMP preparation and staffing for OSD approval
- U **REPEATABLE, TAILORABLE, EXPORTABLE**





# DAPS v0.9



## ASSESSMENT METHODOLOGY FOR PRE-MILESTONE C

### 1.0 Mission Capabilities/Requirements Assessment Area

## ASSESSMENT METHODOLOGY FOR PRE-MILESTONE B

### 2.0 1.0 Mission Capabilities/Requirements Assessment Area

## ASSESSMENT METHODOLOGY FOR PRE-MILESTONE A

|         |        |     |  |    |
|---------|--------|-----|--|----|
|         | 2.0    | 1.0 | Mission Capabilities/Requirements Assessment Area        |    |
|         |        |     |  |    |
|         |        | 2.0 | 1.0 Mission Capabilities/Requirements Assessment Area    |    |
|         |        |     | 4  |    |
| 3.0     |        |     | Sub-Area 1.1 - Operational Requirements                  | 4  |
|         |        | 2.0 | Resources Assessment Area                                | 9  |
|         |        |     | Sub-Area 2.1 - Program Planning and Allocation           | 9  |
|         |        |     | Sub-Area 2.2 - Personnel                                 | 10 |
|         | 3.0    |     | Sub-Area 2.3 - Facilities                                | 12 |
|         |        |     | Sub-Area 2.4 - Engineering Tools                         | 13 |
|         |        | 3.0 | Management Assessment Area                               | 16 |
| 4.0     |        |     | Sub-Area 3.1 - Acquisition Strategy/Process              | 16 |
|         |        |     | Sub-Area 3.2 - Project Planning                          | 19 |
|         |        |     | Sub-Area 3.3 - Program and Project Management            | 21 |
|         |        |     | Sub-Area 3.4 - Contracting and Subcontracting            | 26 |
|         | 4.0    |     | Sub-Area 3.5 - Communication                             | 28 |
|         |        | 4.0 | Technical Process Assessment Area                        | 30 |
|         |        |     | Sub-Area 4.1 - Technology Assessment and Transition      | 30 |
| Verific |        |     | Sub-Area 4.2 - Requirements Development                  | 31 |
|         |        |     | Sub-Area 4.3 - Functional Analysis & Allocation          | 32 |
|         |        |     | Sub-Area 4.4 - Design Synthesis                          | 33 |
|         |        |     | Sub-Area 4.5 - System Integration, Test and Verification | 35 |
| 5.0     | Verifi |     | Sub-Area 4.6 - Transition to Deployment                  | 37 |
|         |        |     | Sub-Area 4.7 - Process Improvement                       | 38 |
|         |        | 5.0 | Technical Product Assessment Area                        | 38 |
|         |        |     | Sub-Area 5.1 - System Description                        | 38 |
| 6.0     | 5.0    |     | Sub-Area 5.2 - System Performance                        | 42 |
|         |        |     | Sub-Area 5.3 - System Attributes                         | 43 |
|         |        | 6.0 | Environment Assessment Area                              | 44 |
|         |        |     | Sub-Area 6.1 - Statutory and Regulatory Environment      | 45 |
|         | 6.0    |     |  |    |

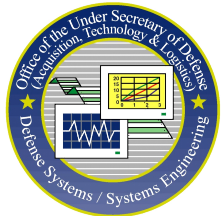


# ***“Focus” Differences Between Milestones A, B, C (slide 1)***



## **Pre-MS A Focus**

- Initial Capabilities Documentation (ICD) for capabilities/requirements planning
- Results of system concept studies
- Analysis of Alternatives
- Technology Development Strategy
- Technology Development Planning
- Technology Risk Reduction
- Systems engineering planning



# ***“Focus” Differences Between Milestones A, B, C (slide 2)***



## **Pre-MS B Focus**

- Results of Technology Development and Maturation
- Capabilities Development Documentation (CDD) for system requirements definition
- Feasibility and stability of requirements
- Incorporation of MOSA, Net Centric capability, etc.
- Acquisition Strategy
- Test and Evaluation Strategy
- Application of systems engineering process in design, test, and verification
- Design producibility and transition to production planning
- Logistics metrics including supportability,

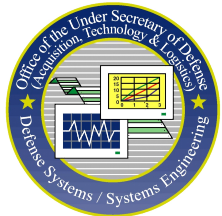


# ***“Focus” Differences Between Milestones A, B, C (slide 3)***



## **Pre-MS C Focus**

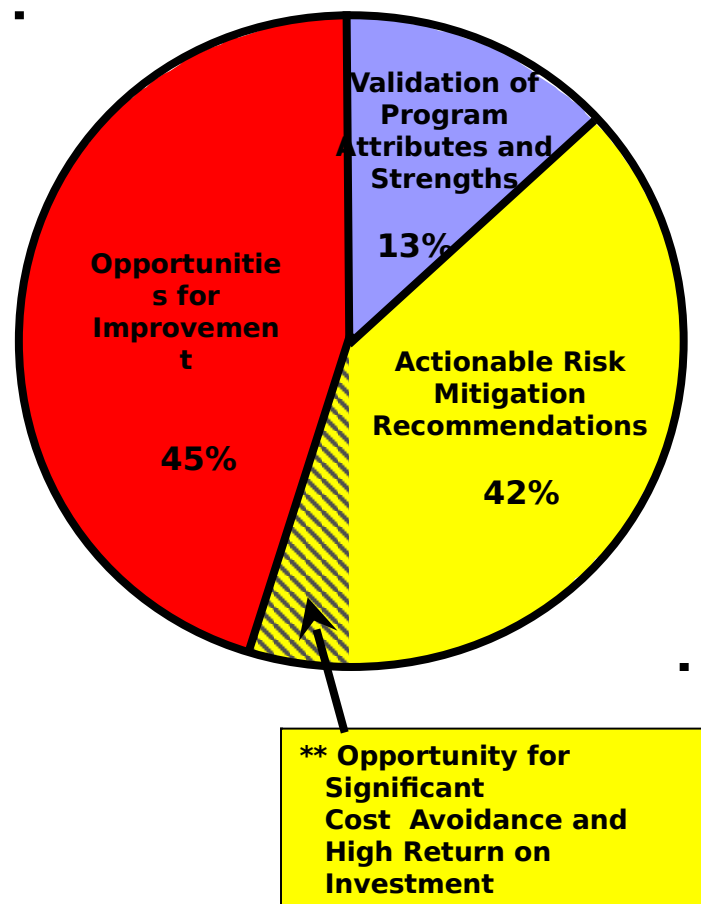
- Design Baseline status
- Status of system demonstration, test, and evaluation
- Execution of systems engineering process
- Production metrics and process controls
- Transition to production planning (materials, facilities, personnel, test)
- Operational Test verification
- Logistics metrics verification (including maintenance verification and training)



# Emerging Results from Initial Program Reviews



- Implementation of over 240 “actionable” recommendations as a result of Defense Systems program reviews† is over 90%
  - 13% - Validation of Program Attribute Strengths
  - 45% - Opportunities for Improvement
  - 42% - Actionable Risk Mitigation Recommendations (5% significant cost avoidance \*\*)
- Most Common issues:
  - Schedules driven by external influences
  - Activities not event driven
  - Requirements management (change control, traceability, Interoperability Requirements)
  - Technical Process (SE, T&E, Risk Management)



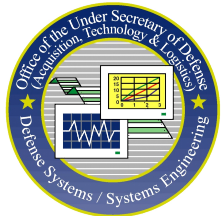
† Based on analysis of first six program reviews



# Sample Review Recommendations (slide 1)



- Formalize a process to work integration issues across program lines
  - Identify key dependencies within FoS by mission area
  - Work FoS integration issues via MOAs, IPTs, and associate contractor agreements
  - Work FoS Develop an integrated FoS master plan to link FoS activities
- Expand complementary system identification and issue resolution process beyond current PEO Management Process
  - Incorporate an issue resolution process into the current SoS management process
  - Expand the membership to include key programs from architecture development work
- Modify the Acquisition Strategy to demonstrate key functionality by MS C
  - Assess integration on mission system equipped aircraft
  - Adopt quantifiable MS C entrance criteria



# Sample Program Recommendations (slide 2)



*Develop MS C entrance Criteria that demonstrates key mode performance, manufacturing readiness level, and reliability*

| Entrance Criteria (examples)   | Approach (examples)  |
|--|--|
| <p><b><u>Reliability</u></b><br/>The reliability estimate of the &lt;program&gt; should be on the reliability growth curve with 80% confidence that corresponds to its requirement at the MS C</p> <p><b><u>Maintainability</u></b><br/>Demonstrate 80% of the diagnostics effectiveness (fault detection, fault isolation and false alarms) and prognostics requirements</p> <p><b><u>Manufacturing</u></b><br/>Demonstrate an Engineering Manufacturing Readiness Level (EMRL) of 4</p> <p><b><u>Mission Systems</u></b><br/>Demonstrate key &lt;program component&gt; functionality and SoS interoperability with complementary systems in the SIL and distributed interactive simulation</p> <p><b><u>Etc...</u></b></p> | <p><b><u>Reliability</u></b><br/>Mix of component and system level testing to demonstrate performance and analysis of approved modifications</p> <p><b><u>Maintainability</u></b><br/>Conduct a Maintenance Engineering Inspection in the SIL or test bed. Demonstrate functionality and insert a minimum of 30 faults on each sub-system</p> <p><b><u>Manufacturing</u></b><br/>Materials are fully characterized, in production and readily available. Three-sigma quality for:</p> <ul style="list-style-type: none"><li>- Manufacturing processes and procedures</li><li>- Machines, tooling and inspection/test equipment</li></ul> <p>No machine/tooling investments required</p> <p><b><u>Mission Systems</u></b><br/>Evaluate information assurance, spectrum management, etc.</p> |

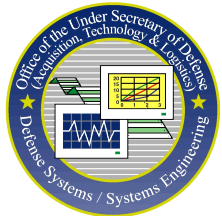




# ***Providing Direct Support to Programs***



- 12 program reviews have been conducted in FY04 since inception of the SE policy (Feb 04)
- 8 Non-Advocate Reviews (NARs) completed in FY04
- 17 programs are currently undergoing review (1<sup>st</sup> Quarter FY05)
- 23 program reviews (to date) are planned for CY05; this number is anticipated to at least double...



# ***Points of Contact***



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